

Using Benchmarks to Develop Regulatory Performance Standards

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**SYMPOSIUM ON UNDERSTANDING
THE VALUE OF BENCHMARKING**

May 19, 2010

Presentation Overview

- **Setting Performance Standards Under the Clean Air Act and Other Environmental Statutes**
- **Role of Performance Standards as Benchmarks in Allowance Allocation under the U.S. Acid Rain Program**
- **Potential Application of CAA performance standards to GHGs**



Setting Performance Standards Under the Clean Air Act and Other Environmental Statutes

(See Handout)



Setting Performance Standards: CAA

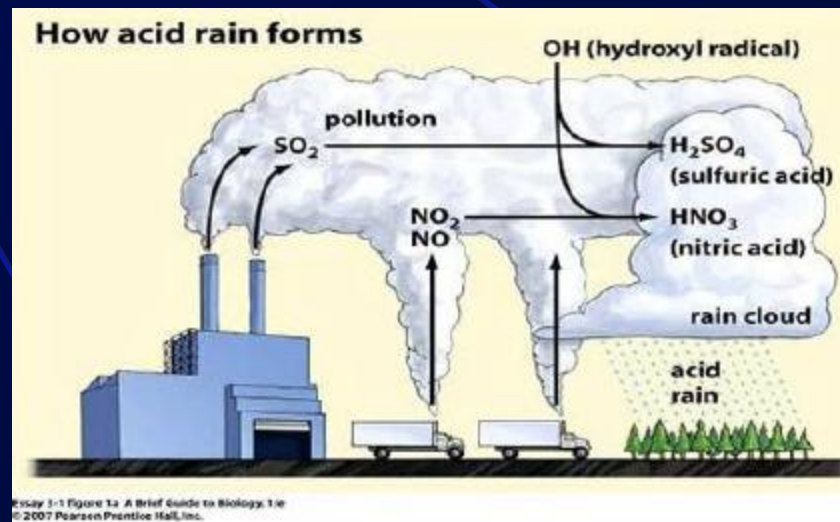
- Clean Air Act has several different **technology-based, performance standard setting** provisions
 - All are emission limits based on a technology
 - All consider feasibility, costs, co-benefits, etc.
 - All have some role for benchmarking
 - But different definitions, processes, and considerations
 - Alphabet soup: NSPS (BDT), NSR-PSD (BACT), NSR-NA (LAER), NAAQS SIP (RACT), Air Toxics (MACT and GACT)
 - MACT example

Other Environmental Statutes

- **Clean Water Act: NPDES conventional (BCT); NPDES toxic and nonconventional (BAT); NPDES new sources (NSPS)**
- **RCRA LDR (BDAT)**



Role of Performance Standards as Benchmarks in Allowance Allocation under the U.S. Acid Rain Program



Key Allocation Formula Decisions

- ***Input*** vs. ***output***
- Updating vs. ***fixed***
- ***Fuel-specific*** vs. ***fuel-neutral benchmarks***
- Formula structure: Heat input x an emission rate for several classes of sources, plus some special cases



Some Specifics

- Heat input baseline: average of 1985-87; some adjustments possible for shutdowns or outages
- Emission rate varied by source category
 - .6 - 1.2, and 2.5 lbs/mmBtu were touchstones
- Bonus allowances for cleaner sources
- Alternative formula for cleaner states



What were we thinking?



NSPS was frame of reference, touchstone or benchmark

- 1971: 1.2 lbs/mmBtu
- 1977/79: % reduction requirement; 0.6 to 1.2 lbs/mmBtu

Potential Application of CAA Performance Standards to GHGs



Challenges of Applying New Source Review to GHGs

- Timing
- Applicability
- What is BACT for GHGs?
- Role of states
- Innovation
- Energy Efficiency



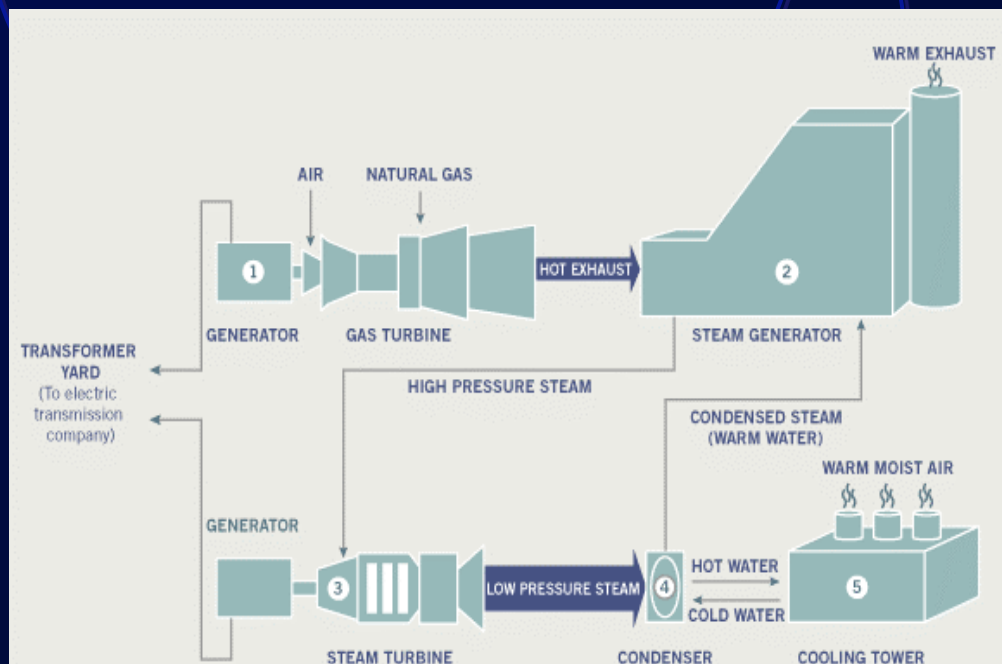
EPA Rising to the Challenge

- **Timing**
- **Applicability**
- **Tailoring**
- **RACT/BACT/LAER Clearinghouse
(benchmarking tool)**
- **Clean Air Act Advisory Committee Climate
Change Work Group**
 - **Innovation**
 - **Energy Efficiency**



Example: Russell City

- Bay Area Air Quality Management District and Calpine agreed to GHG BACT review and voluntary GHG limit as test case
- 612 MW natural gas fired combined cycle power plant in Hayward, CA
- Reviewed available technologies; concluded that high-efficiency power generation technology is the only available and feasible control technology
- BACT review resulted in slightly higher efficiency than originally proposed (56.45 vs. 55.8% efficiency)
- Tried to do an output based standard but wound up doing an input based standard plus an efficiency standard because GHGs per unit of output was too variable
- Covered all GHGs
- Also set BACT for fire pump and circuit breakers



Comparable Projects for Benchmarking

Facility	CEC Application Date	Facility Size (MW)	Thermal Efficiency (LHV)
Colusa Generation Station	11/6/2006	660	56%
Blythe Energy Project Phase II	2/19/2002	520	55-58% (est.)
Lodi Energy Center	9/10/2008	255	55.6%
CPV Vaca Station Power Plant	11/18/2008	660	55%
Victorville 2 Hybrid Power Project	2/28/2007	563	52.7% (w/ duct burn)
Avenal Energy Power Plant ⁴⁴	2/21/2008	600	50.5%
Palomar Energy Project	8/2003	550	55.3% (w/o duct firing) 54.2% (w/ duct firing)
SMUD Consumes Phase I	9/13/2001	500	55.1%

Lessons from Russell City

- Can do GHG BACT like BACT for traditional air pollution, including benchmarking
- Modest impact on industry; modest impact on the environment
- Significant impact on permitting costs for first one; later ones should be more modest



New Source Performance Standards

- How to define source categories
- What is BDT for GHGs for new sources?
- What is cost-effective?
- How to drive innovation
- How to drive energy efficiency



Setting New Source Performance Standards

Section 111 defines NSPS as the “degree of emission limitation achievable through...the best system of emission reduction...taking into account the cost of achieving such reduction and any non-air quality health and environmental impact and energy requirements...adequately demonstrated”
= Best Demonstrated Technology (BDT)

Applicability:

- Source category/stationary source category = industrial segment covered by standard
- Stationary source/affected facility = emission units subject to standard (affected facility means a discrete emitting unit, can be piece of equipment or whole plant)

EPA sets standards but states typically granted implementation, enforcement authority

+ NSPS: How is BDT Determined?

- “Degree of emission limitation” = maximum quantity of pollutant that may be emitted; meant to provide flexibility, but may be few practical means of achieving this
- EPA considers costs, but is not required to conduct a true CBA
 - Considers economic costs to the industry and ability to pass costs along to consumers without affecting demand
 - Incremental “cost-effectiveness” approach (costs of achieving incremental additional reductions under different controls)
- BDT may not be lowest emission standard achievable if it creates negative environmental/health consequences

NSPS: How is BDT Determined?

- Does not require commercial demonstration
 - EPA can rely on pilot projects, those in other industries or countries
 - Must be achievable under wide range of operating conditions
 - Can't be theoretical, but can result from technology forcing (projection based on existing technology, within reason)
- May be specific technologies based on their ability to meet a particular emissions benchmark
- Innovative technology waivers: for new sources with undemonstrated technology; intended to encourage innovation and reductions beyond NSPS, but it has been rarely used, if ever.



Control of existing sources under 111(d)

- EPA may issue guidelines to states for control of existing sources
 - NSPS must exist for source category; pollutant is not a criteria pollutant
 - To date, usually specialized sources that emit discrete types of pollutants
- Guidelines include information contained in NSPS:
 - Known/suspected health or welfare concerns
 - Control systems that reflect BDT
 - Information on costs
 - Time necessary for design, installation, and start-up of control systems
- States required to implement guidelines
 - States submit plan within 9 months, based on guidelines
 - If pollutant threatens public health, state standards must be \geq guidelines, unless on a case-by-case basis the state shows controls are unreasonable

Section 111(d) issues

- How to define source categories
- What is BDT for GHGs for existing sources?
- What is cost-effective?
- How to drive innovation
- How to drive energy efficiency
- Is trading allowed?



The EPA has issued Section 111(d) guidelines for:

- sulfuric acid mist from sulfuric acid plants
- fluoride emissions from phosphate fertilizer plants
- total reduced sulfur (TRS) emissions from kraft pulp mills
- fluoride emissions from primary aluminum plants
- municipal waste combustion (MSW) emissions from solid waste incinerators (NOx trading is allowed)
- nonmethane organic emissions from landfills, hospital/medical infectious waste incinerators
- others

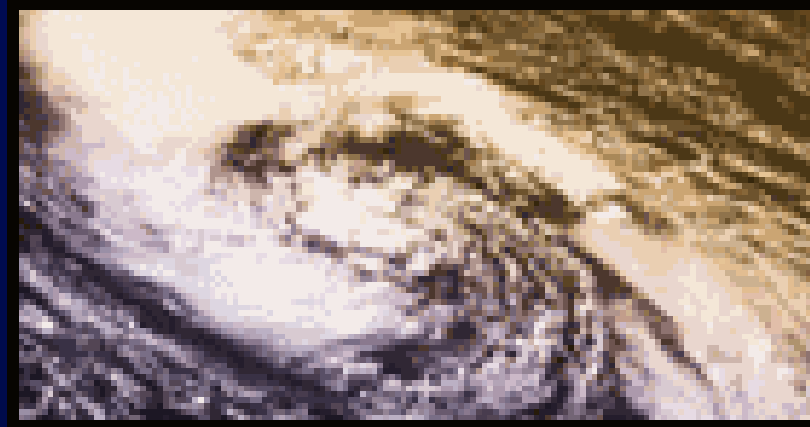
Some Takeaways

- Setting performance standards under the Clean Air Act and other environmental statutes utilizes benchmarking and provides some useful models.
- Performance standards played a role as benchmarks in allowance allocation under the U.S. acid rain program.
- Potential application of CAA performance standards to GHGs poses some special challenges; 111(d) may be applied to GHGs.



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